



# STATE OF NEVADA

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DIVISION OF ENVIRONMENTAL PROTECTION

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## **Nevada Voluntary Mercury Reduction Program (VMRP) Questions and Answers May 2005**

### **What is the goal of the Voluntary Mercury Reduction Program (VMRP)?**

The goals of the VMRP are to:

- Achieve significant, permanent and rapid reductions in mercury air emissions from gold mining operations, and
- Achieve reductions through approaches that are most suitable for each individual mining facility.

### **What are the expected environmental results?**

The VMRP goals are a 33% reduction in mercury air emissions by the end of 2003 and a 50% reduction by the end of 2005. This reduction is measured using baseline emissions of 21,098 pounds of mercury from 2001.

### **What is the timeframe of the VMRP?**

The VMRP was launched in June of 2002 and a review is intended in 2005. Emissions for the last year will be reported in July 2006.

### **What results have been achieved to date?**

- The most recent VMRP results for the third year of the program showed 3,755 pounds of mercury air emissions released. This represents an 82% reduction, or 17,343 pounds reduced from the 2001 baseline.
- The VMRP report for the year 2003 showed 5,396 pounds of mercury air emissions released. This represents a 74% reduction, or 15,702 pounds reduced from the 2001 baseline of 21,098. (2004 results will be reported in July of 2005.)
- The VMRP report for the year 2002 showed 12,743 pounds of mercury air emissions released. This 8,355 pound emission reduction was a 40% reduction from the 2001 baseline of 21,098.

### **Why did EPA and NDEP develop the VMRP?**

The EPA Toxic Release Inventory (TRI) Report for the year 2000 (based on 1998 data) included mines for the first time. The Nevada gold mines were found to be the largest source of mercury air emissions in Region 9.

### **How does a mine determine its TRI releases for mercury?**

A facility that measures or monitors its emissions through a rigorous monitoring program can report the measured results. Many wastewater dischargers use this approach.

Alternatively, a facility can make its best engineering judgment on the quantity of pollutants released based on mass balances and assumptions about what pieces of equipment may release a pollutant. This is common for air discharges. TRI does not require testing, so best available data is acceptable.

### **What is the timeline of the VMRP?**

**1998:** Nevada gold mines were required to report mercury emissions to TRI for the first time, if their total mercury releases were 10,000 pounds or more. (The 1998 TRI data is released in 2000.)

**1999:** EPA Region 9 sees large quantities of mercury air emissions from gold mines during review of a December 1999 draft TRI report.

**2000:** TRI published 1998 emissions indicating Nevada gold mining as the biggest source of mercury in the Region. EPA meets with and tours Barrick, Newmont and Anglo Gold to understand sources of mercury air emissions. EPA determines there are neither Clean Air Act violations nor a MACT standard for the industry. EPA Region 9 decides to pursue voluntary program with mines to reduce emissions.

**Jan 2001:** EPA Region 9 meets with the four mining companies, Newmont, Barrick Goldstrike, Placer Dome, Anglo Gold (now Queenstake) and NDEP to begin discussions of the voluntary program.

**Nov 2001:** EPA Region 9 sends draft program to mines and NDEP defining MACT equivalent approach to achieving mercury reductions.

**April – September 2001:** Mines conduct intense baseline data collection efforts including expanded mercury monitoring and mass balances for various processes. Mines increase mercury emission estimates based on their investigations. Knowledge gained from increased monitoring of mercury air emissions subsequent to the 2000 TRI report resulted in baseline levels for the voluntary mercury emissions reduction program that exceed those reported in TRI. In order to reflect the most accurate emissions, the VMRP baseline was set with the revised data.

**June 2002:** Voluntary program launched at Nevada Mining Association Environmental Committee, setting the goals of 33% reduction by 2003 and 50% reduction by 2005.

**Aug 2003:** VMRP first year (2002) reductions reported: 8,355 pounds reduced or 40% reduction from 2001 baseline of 21,098 pounds.

**Aug 2004:** VMRP second year (2003) reductions reported: an additional 7,347 pounds reduced or 75% reduction from 2001 baseline of 21,098 pounds.

### **Why did EPA and NDEP use the voluntary approach to address mercury air emissions?**

When EPA Region 9 looked at ways to reduce these emissions, it was determined that there was no existing regulatory requirement for the mines to control mercury emissions. The Clean Air Act regulations establishing Maximum Achievable Control Technology (MACT) emissions standards for mercury did not require standards for the gold mining industry.

EPA did have the discretion to establish a MACT for the gold mining industry, but the rule making process would be lengthy and there would be no regulatory requirement for many years.

EPA Region 9 suggested a voluntary approach to reduce the emissions modeled after EPA's successful 33/50 program. A voluntary program had the potential to get pollution control equipment installed quickly.

### **How long would a formal MACT regulatory rule making have taken?**

Had a regulatory approach been pursued in the case of the gold mines, it would have taken at least 4 years for the rules to be developed and another 2 years to allow companies to install MACT air emission controls.

### **What is the advantage of the Voluntary Mercury Reduction Program?**

The VMRP emission control requirements were considered to be the equivalent of what a MACT regulatory rule making process would require. Through the VMRP these controls were installed quickly. The development of a MACT rule would have take approximately 6 years before the controls would be in place. During the 6 years of the rule making process, 126,000 pounds of mercury emissions would have occurred if no new air emission controls were put in place. As a result of the VMRP, these mercury emissions will be reduced by approximately 70%.

### **How does a gold mine achieve its mercury reductions in the VMRP?**

Under the Maximum Achievable Controls Technology or "MACT Equivalent Track", a mining facility will implement and install or has implemented and installed certain controls that are assumed to be equivalent to MACT controls.

Under the "Process Modification Track" a mining facility will use existing implemented and installed controls coupled with pollution prevention, waste minimization, or pollution abatement measures to achieve mercury air emission reductions.

### **How were baseline mercury air emissions established for the Voluntary Program?**

TRI 2000 results (based on 1998 data) showed a total of 13,557 pounds. This number did not include Placer Dome's Cortez mine which was not required to report at that time. After adding Placer Dome, including previously unknown sources of emissions and improving the testing, the baseline for the program was set at 21,098 pounds.

### **Why are there differences between reported TRI emissions and the emissions reported under the VMRP?**

The baseline emissions numbers we use in the Voluntary program (21,098 lbs for 2001) were increased from the TRI reported emissions after the mines conducted more thorough investigations. TRI does not require testing, only the best available information. The mines had tested some of the larger sources and provided that data to TRI. Knowledge gained from testing of units not formerly tested resulted in baseline levels for the voluntary program that exceed those reported in TRI. So the VMRP baseline was set with the revised data.

### **Why were these 4 companies approached for the program?**

98% of mercury air emissions reported to TRI for Region 9 came from these four Nevada mining companies. When EPA Region 9 and NDEP approached them, they were willing to explore a voluntary program to reduce their emissions.

**Why weren't more specific limits/goals set for each mine?**

EPA decided to set goals based on the industry as a whole rather than on individual operations. This is a common practice in other voluntary programs and allows each company the flexibility they need to make the best modifications or adopt the best controls for their facility.

**How can you trust that the mines are actually doing what they are claiming they're doing?**

In addition to the cooperative nature of the relationship between NDEP, EPA and the mines, an external third party has independently evaluated the program and the results. For example, in 2001, the Queenstake (formerly AngloGold) spent \$170,000 on carbon kiln upgrades for emissions controls. They also spent \$120,000 on the new process improvement - a hypochlorite injection system for emission control in the roasters. They will continue to spend approximately \$60,000 annually in emission analysis at their facility.

**How do you know which mine is doing which track of the voluntary program?**

There are only 4 mines participating. Two mines, Queenstake and Placer Dome adopted new process modifications in addition to MACT equivalent controls (the hypochlorite injection system for emission control in roasters and application of a chemical mercury trapping agent). The other two, Newmont and Barrick, chose to address the emissions primarily through best available "end of stack" technologies qualifying for the MACT equivalent track. In the last year, Newmont has also added the hypochlorite injection system modification, based on its successful application at Placer Dome.

**Since Newmont had already installed controls many years prior to the program, how is it that they are still showing reductions?**

Newmont continues to show reductions in mercury emissions for various reasons. One of their two carbon regeneration kilns was retired since the program's inception, accounting for some reduction. Newmont has also installed the hypochlorite injection system, successfully used by one of the other mines, which has reduced mercury emissions. Reductions can also be achieved by improving the efficiency of their processes and control equipment. Finally, as a naturally occurring element, mercury content in the ore varies.

**What are the sources of mercury emissions in mining?**

The mercury emitted to the air originates in the ore. Mining companies use cyanide solutions to extract gold from the ore. These solutions also extract mercury. Processing of the cyanide solutions to recover the gold can involve electrowinning units, refining furnaces, carbon regeneration kilns, and mercury recovery retorts. All of these unit processes are potential sources of mercury air emissions. Ore roasters and autoclaves used to oxidize some types of gold bearing ore can also be point sources of mercury air emissions.